

AMENDMENTS TO THE CLAIMS

Please cancel claims 14-22 without prejudice or disclaimer of their underlying subject matter.

Please amend the claims as follows.

1. (canceled)

2. (currently amended) An apparatus for electroplating and thereby forming a metal film by way of an electroplating method, said apparatus comprising:

a plating chamber containing a holder for holding a substrate used in a large scale integration process and containing a plating bath;

a pre-treating chamber, in which a pre-treatment of said substrate to be plated is conducted, and

a transportation chamber connected to said pre-treating chamber by a first gate valve and connected to said plating chamber by a second gate valve,

wherein said transportation chamber is connected to a post-treating chamber by a third gate valve, connected to a loading side wafer container by a fourth gate valve, and connected to an unloading side wafer container by a fifth gate valve, and

wherein said pre-treating chamber, said transportation chamber, and said plating chamber are combined to be maintained together in a non-oxidative atmosphere.

3. (canceled).

4. (previously presented) An apparatus for electroplating as claimed in claim 2, wherein:

said non-oxidative atmosphere is selected from the group consisting of a rare gas atmosphere, a nitrogen gas atmosphere and a hydrogen gas atmosphere.

5-7. (canceled).

8. (previously presented) An apparatus for electroplating as claimed in claim 2, wherein:

said plating chamber includes a gas supply port for supplying said non-oxidative gas to said plating chamber and a gas evacuation port for evacuating gas contained in the plating chamber.

9. (previously presented) An apparatus for electroplating as claimed in claim 2, wherein:

said metal is a copper film,

said plating chamber includes means for embedding said copper film in a groove or a connecting hole of said substrate in said plating bath, and

voids formed in said copper film include an inert gas forming said non-oxidative layer, and such that said copper film may be heat treated without oxidation of said film.

10. (canceled).

11. (previously presented) An apparatus for electroplating as claimed in claim 2, wherein:

each of said pre-treating chamber, said transportation chamber, and said plating chamber individually includes an inert gas supply and a gas exhaust.

12. (previously presented) An apparatus for electroplating as claimed in claim 2, wherein said plating bath comprises a plating solution for forming a plating on said substrate, said plating bath being maintained in said non-oxidative atmosphere, said plating containing a void having said non-oxidative atmosphere disposed therein.

13. (previously presented) An apparatus for electroplating as claimed in claim 2, wherein said transportation chamber includes a transportation robot disposed therein, said transportation robot transporting said substrate.

14-22. (canceled).

Please add the following new claims.

23. (new) An apparatus for electroplating, comprising:

a loading side wafer container, a first gate valve connecting said transportation chamber with said loading side wafer container;

pre-treatment means for pre-treating an article to be electroplated, a second gate valve connecting a transportation chamber with said pre-treatment means;

electroplating means for electroplating said article by immersion of said article in an electroplating bath provided in a non-oxidative atmosphere, a third gate valve connecting said transportation chamber with said electroplating means;

a post-treating chamber, a fourth gate valve connecting said transportation chamber with said post-treating chamber; and

an unloading side wafer container, a fifth gate valve connecting said transportation chamber with said unloading side wafer container.

24. (new) The apparatus as set forth in claim 23, wherein:

said transportation chamber includes a transportation robot for transporting said article.

25. (new) The apparatus as set forth in claim 23, wherein:

said function of pre-treating is carried out in said non-oxidative atmosphere.

26. (new) The apparatus as set forth in claim 23, wherein:

said non-oxidative atmosphere includes helium, neon, argon, xenon and krypton, nitrogen gas or hydrogen gas.

27. (new) The apparatus as set forth in claim 23, wherein:

during said immersion, a copper film is embedding in a groove or a connecting hole of said article, voids forming in said copper film having said non-oxidative atmosphere.

28. (new) The apparatus as set forth in claim 23, wherein:

said electroplating means includes gas supplying part, gas evacuation part; an anode; a cathode; means for holding said article;

said gas supplying part supplying said non-oxidative gas to said electroplating means,

said gas evacuation part evacuating said non-oxidative gas from said electroplating means;

said anode being inside said electroplating bath,

said means for holding said article being movable and being equipped with a cathode, and

said cathode being connected to a surface to be plated of said article.

29. (new) The apparatus as set forth in claim 23, wherein:

an interior of said electroplating means is maintained at said non-oxidative atmosphere.

30. (new) The apparatus as set forth in claim 23, wherein:

said article is a wafer.

31. (new) The apparatus as set forth in claim 30, wherein:

said wafer is a silicon wafer.